Parent-Child Communication in Families with Children Conceived with Assisted Reproductive Technology: Associations with Disclosure and Parent-Child Relationship Quality

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Abstract

Existing research on parental disclosure of Assisted Reproductive Technology (ART) use to the resultant child has largely neglected the family disclosure context when investigating the impact of disclosure. This study proposed that, in order to fully understand that impact, the disclosure context must be considered. Parent-child communication, as conceptualized in the Family Communication Pattern Theory, was the focus of this study. I examined the associations among parent-child communication, disclosure, and parent-child relationship using data from 51 ART families with children between 7 and 12 years old. Probit regression and path analysis showed that parental listener responsiveness was significantly associated with both disclosure and parent-child relationship quality, but disclosure did not mediate the association between this communication characteristic and parent-child relationship quality. Study finding suggests that ART disclosure may not be associated with parent-child relationship quality for children in this age group and general parent-child communication dynamics remain central to parent-child relationship quality in ART families.

Keywords: Assisted Reproductive Technology, disclosure context, family communication pattern, parent-child relationship

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In the United States, assisted reproductive technology (ART) has become an increasingly popular choice for family-building. It is estimated that in 2010, ART contributed to 1.5% of all U.S. births (Sunderam et al., 2013). The most common procedure is *in vitro fertilization* (IVF), during which donor gametes may or may not be used (CDC, 2011).

In families with ART conceived children, parents need to consider whether or not to disclose ART use to the child. Disclosure has different connotations. For children conceived with the intended parents' gametes, disclosure usually means that the parents discuss the ART procedures with the children (Peters, Kantaris, Barnes, & Sutcliffe, 2005). For children conceived with donor gametes, disclosure primarily means discussing both the ART procedure and the use of donor gametes with the children (van den Akker, 2006).

Parents' disclosure decision is driven by multiple motivations and concerns. Parents may worry that the child will feel different from others after being told (Ludwig et al., 2008) or believe that nondisclosure protects the child from emotional burden and identity issues (Shehab et al., 2008). By contrast, parents may favor disclosure for reasons such as medical concerns (Daniels, Grace, & Gillet, 2011), emphasis on openness in the family (Paul & Berger, 2007), or prevention of inadvertent disclosure by others (Daniels et al., 2011).

A major goal of ART disclosure research is to determine the impact of disclosure on parent-child relationship quality. Researchers have examined the relationship between disclosure status and parent-child relationship quality, but disclosure has

never been examined in specific family context (Brewaeys, Golombok, Naaktgeboren, de Bruyn, & van Hall, 1997; Golombok et al., 2002a; Greenfeld, Ort, Greenfeld, Jones, & Olive, 1996; Ludwig et al., 2008; Nekkebroeck, Bonduelle, & Ponjaert-Kristoffersen, 2008; Peters et al., 2005; Readings, Blake, Casey, Jadva, & Golombok, 2011; Rosholm, Lund, Molbo, & Schmidt, 2010; van Berkel, Candido, & Pijffers, 2007). The disclosure context contains the determinants of disclosure discussed above along with other general family dynamics. It may influence whether disclosure has an impact on parent-child relationship. Therefore, researchers must begin to investigate the impact of disclosure within the context in which disclosure happens.

This study aimed at one vital aspect of the disclosure context, communication. This study framed disclosure as essentially about parent-child communication because the origin of the child is one among many topics that ART families may or may not talk about (Paul & Berger, 2007). General parent-child communication characteristics may influence ART-related communication. It is also known that parent-child communication powerfully affects parent-child relationship (Montgomery, 1988). Therefore, if communication is related to both disclosure and parent-child relationship, taking communication into account can clarify the association, or lack thereof, between disclosure and parent-child relationship.

Theoretical Groundwork

Family Communication Patterns Theory (FCPT; Koerner & Fitzpatrick, 2002b, 2006) served as the framework of this study. Its conceptualization of family

communication fits this study's focus on general family communication characteristics as one determinant of disclosure. FCPT conceptualizes *conversation orientation* and *conformity orientation* as central beliefs that largely determine how families communicate (Fitzpatrick & Ritchie, 1994). The centrality of these two orientations in various family outcomes has been empirically supported (Koerner & Fitzpatrick, 2002a).

According to FCPT, conversation and conformity orientations are ways in which families create and share social realities and are crucial to family functioning. Sharing social realities means the family members have congruent perceptions, interpretations and evaluations of objects, people, and behaviors (Koerner & Fitzpatrick, 2003). Conversation orientation is the degree to which family members create shared reality through discussing a variety of topics. Families high in conversation orientation interact without restraint and have frequent conversation about their feelings and thoughts on different issues. Conformity orientation is the degree to which families, in particular parents, encourage adherence to familial values and create shared reality through authority and rule-setting. Families high in conformity orientation emphasize harmony and values uniformity instead of individual beliefs.

This study proposed that family communication orientation, as a way of creating shared reality, may partly influence how parents create the reality about the conception of the child. For example, conversation-oriented families are open to discussing a variety of topics (Koerner & Fitzpatrick, 2002a), so parents in such families may also be open to discussing ART with the children. By contrast, because

families low in conversation orientation discuss few topics openly and have less exchange of private thoughts and feelings (Koerner & Fitzpatrick, 2002a), these parents may be more hesitant about disclosure.

On the other hand, families high in conformity orientation value harmony, cohesion, conflict avoidance and interdependence of family members (Koerner & Fitzpatrick, 2002a). Because disclosure may challenge individual identities, family relationships, and the very concept of family, these families may be more cautious about disclosure. Contrarily, families low in conformity orientation emphasize the individuality and independence of family members and regard family relationships as not more important than other external relationships (Koerner & Fitzpatrick, 2002a). Therefore, such families may be less concerned about the potential impact of disclosure, possibly making the parents more likely to disclose.

Literature Review

Disclosure in Donor Families

Most research on ART disclosure focuses on families with children conceived using donor gametes. Due to the lack of a genetic link between the child and at least one parent, parents can be apprehensive about disclosure, especially if they believe in the importance of a genetic link to parenthood (van den Akker, 2006). Earlier studies showed that the majority of parents in these families had not or did not intend to tell the child about the conception method (Golombok et al., 1996, 2002b; Gottlieb, Lalos, & Lindblad, 2000). In recent years, attitudes about disclosure have gradually turned in the direction of openness (Daniels, 2007; Greenfeld, 2008). Still, even though more

parents are expressing the intention to disclose, the rate of actual disclosure remains much lower than that of disclosure intention (Daniels, Gillett, & Grace, 2009; Casey, Readings, Blake, Jadva, & Golombok, 2008).

Possibly due to variations in samples and disclosure contexts across studies, evidence of an association between disclosure and child outcomes or parent-child relationship is mixed. Donor offsprings who were told about the method of conception during adulthood had significantly more negative experiences than those told during childhood or adolescence (Jadva, Freeman, Kramer, & Golombok, 2009; Kirkman, Rosenthal, & Johnson, 2007; Turner & Coyle, 2000). Other studies actually found more positive parent-child relationships in disclosing families than in non-disclosing ones with school-aged children (Lycett, Daniels, Curson, & Golombok, 2005), and that children who were told of their origins were reported as showing fewer emotional problems than those who were not told (Casey et al., 2008). However, it is not known whether these findings were due to disclosure per se or other factors such as more open communication by these parents (Jadva et al., 2009). This study addressed this very concern by incorporating parent-child communication.

Disclosure in Non-Donor Families

For couples who conceived using their own gametes, disclosure of the conception method has been assumed to be less of a concern. Nevertheless, studies examining disclosure in these families showed that despite the genetic relatedness, parents still varied greatly in disclosure attitudes and behaviors, and the decision was seldom straightforward (Peters et al., 2005). Parents may be concerned about the child's

response and social reactions after disclosure (Peters et al., 2005) or reluctant to make the children different by disclosure (Braverman, Boxer, Corson, Coutifaris, & Hendrix, 1998). The disclosure of a fertility problem can create a strain on family relationships, especially if parents have not come to terms with the experience of infertility (McWhinnie, 1996). Many parents may not know how to approach the topic and put off the decision, but topic avoidance may negatively impact children (Imber-Black, 1998).

A few studies examined the effect of disclosure in these families. Adults who knew about their origin all along had no difficulty accepting the fact and did not think that it negatively influenced their well-being (Siegel, Dittrich, & Vollmann, 2008). Most other studies did not find any significant difference in child or relationship outcomes between disclosed and nondisclosed families (Braverman et al., 1998; Colpin & Bossaert, 2008; Ludwig et al., 2008; Nekkebroeck et al., 2008).

Existing literature suggests a need to investigate parental disclosure to children conceived using their own gametes (Ludwig et al., 2008; Nekkebroeck et al., 2008; Siegel et al., 2008). Similar to parents who used donor gametes, these parents have varied motivations and concerns. Disclosure should not be viewed as inconsequential for this population simply because the child is genetically related to both parents. The impact of disclosure should also be further examined in context.

Parent-Child Communication and Disclosure

Linking disclosure to family communication was inspired by research that examined the association between family communication dynamics in general and

management of private or sensitive information. For example, in the case of inherited genetic risks, parents who emphasized open communication in general felt a strong sense of responsibility to discuss information about inherited genetic risks to prevent a child from worrying and promote trust and openness (Metcalfe, Coad, Plumridge, Gill, and Farndon, 2008; Wilson et al., 2004). In studying disclosures of maternal HIV infection to seronegative children, Hawk (2007) reported mothers' general opposition to keeping secrets from family members and desire for honest relationships with children as reasons for disclosure. In sum, openness in family communication appears to extend to communication about important sensitive information. Therefore, it is possible that conversation orientation, which indicates a preference for open family communication, may be related to parental disclosure of ART.

On the other hand, the conformity orientation is further conceptualized into structural traditionalism and conflict avoidance (Schrodt, 2005), the former emphasizing a family's authority structure and the latter addressing the suppression of the discussion of unpleasant topics (Schrodt, Witt, & Messersmith, 2008). If conformity orientation inherently involves topic avoidance, it may be associated with avoiding discussions about ART.

Studies examining family communication as conceptualized by FCPT also suggest the possibility that conversation and conformity orientations may be associated with disclosure. In a meta-analysis of studies using FCPT, conversation and conformity orientations were found to be associated with a wide variety of family and individual outcomes, including the tendency of self-disclosure (Huang, 1999;

Schrodt et al., 2008). For the empirical and theoretical reasons above, this study hypothesized that parent-child communication is related to parental disclosure of ART.

Parent-Child Communication and Parent-Child Relationship Quality

Family researchers have long recognized that family communication significantly influences family relationships (Montgomery, 1988). Children's relationships with their parents were influenced by both the amount and the type of communication that takes place in those relationships (Barnes & Olson, 1985; Noller, 1995; Stafford & Bayer, 1993). Conversely, limited communication may negatively influence the parent-child relationship. For example, a meta-analysis of studies on parent-child communication about inherited genetic conditions showed the inability to openly discuss problems was found to result in tense family relationships (Metcalfe et al., 2008). In sum, family communication reflects the interpersonal connections among family members and therefore has the potential to predict the quality of family relationships (Vangelisti, 2004). If family communication influences both family relationship and disclosure decision, it is crucial to clarify whether the relationship outcome is associated with (non)disclosure per se or with the family communication context that facilitates or inhibits disclosure.

Disclosure and Parent-Child Relationship Quality

The North American culture highly values openness and disclosure in close relationships (Bochner, 1982; Parks, 1982). Being willing to talk openly about things is identified as a standard for good family relationships (Vangelisti, Crumley, &

Baker, 1999), and topic avoidance or secrecy can be harmful to family relationships (Caughlin et al., 2000; Golish, 2000; Vangelisti, 1994). More importantly, individuals' relationship satisfaction is inversely related to both their own topic avoidance and their perception that the relational counterpart avoids topics (Caughlin & Golish, 2002). Therefore, if parents avoid topics in front of the child, they will view the parent-child relationship as less satisfying; when the child perceives parental topic avoidance, his or her parent-child relationship satisfaction may also decrease.

The impact of disclosure or secrecy is inextricably linked to the underlying motivations or concerns and the relational context. Research on self-disclosure showed that the association between topic avoidance and relationship satisfaction is affected by the particular reasons for which individuals avoid topics (Petronio, 2002). If a person avoids a topic in order to enhance a relationship, such avoidance may help foster satisfaction. By contrast, if a person avoids topics for reasons unrelated to relationship enhancement, the inverse relationship between topic avoidance and relationship satisfaction may be amplified (Caughlin & Afifi, 2004). Therefore, this study investigated disclosure along with one of its potential determinators, parent-child communication characteristics.

This study posed two questions: (1) Are parent-child communication characteristics associated with parental disclosure of ART to the child? (Path B in Figure 1) (2) Are parent-child communication characteristics both directly (Path A) and indirectly (Path B and C) associated with parent-child relationship quality through the mediation of disclosure?

Mother's Education Level and Child Gender

Research on parenting has long recognized the crucial role of parents' education level in a variety of parent and child outcomes. Education level influences parents' beliefs and actions regarding parenting. For example, more highly educated parents seem to have more modern parenting style. They emphasize the environment rather than heredity as the main factor in development, perceive themselves as high in influence, are in favor of democratic educational practices, and give much attention to the psychological aspects of parent-child interaction (Goodnow, 1988). Parents who received low to little education tend to have more traditional parenting style (Palacios, 1986; Goodnow, 1988) and hold views consistently opposite to modern parenting style. In particular, mother's education level has been found to be related to a series of parental beliefs, behaviors, and child outcomes, such as communication with the child about rules and consequences (Ennett et al., 2004; Shinn & O'Brien, 2008), child perceptions of external control, and child endorsement of insecure attachment prototype (Hortaçsu, 1995). Therefore, this study partialed out the effect of mother's education level to better reveal the associations between parent-child communication and disclosure as well as child outcome.

Child gender is another demographic characteristic that contributes to considerable differences in parenting and child outcomes. Depending on the child's gender, parents tend to approach parenting differently, and parent-child relationship outcomes also differ considerably (Levin, Dallago, & Currie, 2012; Starrels, 1994). Specifically, parents tend to adopt different communication styles when interacting

with sons as compared to daughters (Lanvers, 2004; Shinn & O'Brien, 2008). Therefore, the effect of child gender was also partialed out from the relationships under examination.

Method

Participants

The families that provided data for this study were participants in the Family Communication Project (FCP). The FCP studied the relationships, dynamics and outcomes of families that have used ART to conceive children. Participants were recruited from the University of Minnesota Reproductive Medicine Center. Out of the eligible families (N=309), 86% of eligible families were located. Out of those located families (N=265), 82% (N=216) agreed to participate in the project. All participants were asked to complete an online survey assessing family demographics, family relationships, and individual family member behavior. After the online survey, participants were also invited to attend an in-lab interview session. The 51 families in this sample were from those who attended the in-lab session. There were 76 ART conceived children in these families, aged 7 to 12 years (see Table 1 for demographic information). Twelve of the 51 families had disclosed (23%, n = 14 children), among which one child was conceived using donor gametes. Among the 39 families that had not disclosed (77%, n = 62 children), 7 children from 5 families were donor conceived.

Procedures

The research procedures were proved by the University of Minnesota IRB. Families who completed the online survey were invited to participate in the in-lab interview. During the 60- to 90-minute lab visit, they completed two questionnaires relevant to a video-recorded family task and then engaged in the task. The task was designed to elicit a variety of family interactions representative of the communication orientation of the family members. The video camera was inconspicuous but the family members were aware of being videotaped. The video-recorded family interactions were later coded by trained coders.

Measures

Parent-child communication. Family interactions in the video-recorded task were coded by trained coders on six communication characteristic scales from 1 to 9 (1 = *not at all characteristic of the person*, 9 = *mainly characteristic of the person*). The overall approach to coding behavior using these scales was adapted from techniques developed for the Iowa Family Interaction Rating Scales (IFIRS; Melby et al., 1998). The scales were listener responsiveness, communication, concept focus, authority, control, and social focus (see Table 2 for definitions and descriptions), the former three representing the conversation orientation and the latter three the conformity orientation. IFIRS has been widely used in family research and also has been deemed as a well-established family measure to use in diverse populations (Alderfer et al., 2008; Williamson, Bradbury, Trail, & Karney, 2011). For this project, coders participated in six weeks of training and passed written and observational reliability tests. Afterwards, they coded tapes independently but also met with a

second coder to reach one hundred percent consensus on all codes for all tapes. To prevent coder drift, they attended weekly coder training meetings while coding tapes.

Although all dyadic interactions were coded, this study only examined parent-to-child communication, because disclosure is a parent-to-child process. The data were on child-level because one parent may interact differently with each child.

Conversation orientation. Listener responsiveness, communication, and concept focus represented the conversation orientation. Listener responsiveness indicates a parent's attentiveness to the verbalization of the child. Communication represents a parent's ability to express his/her opinions and openness to information exchange with the child. The listener responsiveness and communication scales have been previously used to measure the conversation orientation (Rueter & Koerner, 2008). Concept focus indicates the degree to which the parent considers and discusses information about the topic in decision-making rather than defer to other people's opinions. It was added in this study as another dimension of the conversation orientation because the decision-making process is highly reflective of how families create shared reality. In conversation-oriented families, decisions are reached through consideration of and discussion about relevant information, not through the dictation of an authoritative figure.

To compute combined parental scales, both parents' ratings were averaged (r_{listen} = .40**, $r_{\text{communication}}$ = .13, r_{concept} = .07). The logic was that the degree of conversation orientation of the parents should be accumulative, each parent either adding to or detracting from the degree of parental conversation orientation. For the overall

parental conversation orientation, both parents' ratings for all three components were averaged (Cronbach's $\alpha = .68$).

Conformity orientation. Authority, control, and social focus represent the conformity orientation. Authority indicates the extent to which the child relies on the parent's view when making decisions. Control is the degree to which the parent can successfully influence the child's actions or opinions, and it was previously used in Rueter and Koerner (2008) to measure the conformity orientation. Social focus indicates how much a parent uses social influence (i.e. rely on rules and/or authority) when making decisions. The authority and social focus scales were included in this study as two other crucial dimensions of conformity orientation.

To create combined parental scales, the higher rating between the parents was selected ($r_{authority} = .04$, $r_{control} = -.24^*$, $r_{social} = -.01$). The conceptual reason was that the level of conformity orientation should be determined by the higher level of authority, control and social focus between parental figures rather than by the aggregate level. For the overall conformity orientation, each parent's conformity scales were added up separately, and the higher one between the two parents was taken to represent the overall parental conformity orientation (Cronbach's $\alpha = .44$ and .32 for fathers and mothers respectively).

It should be noted that, although the overall communication orientations were created for the hypothesized relationships, individual components consisting the orientations were also tested. The rationale was that this study was among the first to explore the relationship between communication orientation and ART disclosure, and

we do not know yet whether it is the orientation itself or some specific component of the orientation that plays a role in disclosure. The components capture conceptually different dimensions of the communication orientations, so it is possible that the hypothesized relationships might exist only for certain components. Therefore, this study tested both the overall communication orientations and their components.

Parent-child relationship quality. The quality of parent-child relationship was also observed and coded by the coder based on the video-recorded task (see Table 2). Both parents' ratings were averaged to create overall parent-child relationship quality (r = .43**).

Disclosure status. In the online survey, parents were asked whether the ART conceived child knows about ART and that answer was used to represent whether the parents had disclosed (*yes* = 1, *no* = 0). The question did not directly ask parents whether they had disclosed, so it was possible that the child might have known from people other than the parents. However, in existing literature on ART families, the overwhelming majority of studies equated child knowing about ART with parental disclosure (e.g. Daniels et al., 2009; Casey et al., 2008; Siegel et al., 2008), especially with children within the age group of this sample.

Control variables. In the online survey, parents were asked "What is the highest level of education you have completed?" and "What is the highest level of education your spouse or partner has completed?". The answer ranged from 1 to 7 (1 = Did not complete high school or GED, 2 = High school diploma or GED, 3 = Some college, 4 = Associate's degree, 5 = Bachelor's degree, 6 = Master's or Professional degree, 7 =

Doctorate). Parents also provided the gender of the child.

Analytical Procedures

Missing data analysis. Most study variables had one or two cases missing (1% - 2.6%), while mother-child relationship quality had four (5%). T-test and chi square comparisons revealed no significant difference between cases with missing data and cases with complete data. Because recovery of missing data produces less biased study results than listwise deletion of missing data (Enders, 2010), Full Information Maximum Likelihood (FIML) was used to estimate study parameters.

Research Question 1: Communication and disclosure. The first stage of analysis was to investigate whether parent-child communication characteristics were associated with disclosure status (Path B in Figure 1), using probit regression analysis in Mplus 7. Because the study sample included multiple children within the same family, there was possibility of producing inflated t-values because of shared family variance (Cook, 2012). To deal with the inflated errors resulting from nested data, all regressions were conducted using the COMPLEX specification (Muthén & Muthén, 1998-2012).

To examine whether communication characteristics were associated with disclosure, eight probit regressions were conducted, with disclosure status as the dependent variable and each communication variable as the independent variable. Child gender and mother's education level were control variables.

Research Question 2: Communication, disclosure, and relationship quality. The second stage was to test the mediation model (Figure 1), which included the

direct association between parent-child communication characteristics and relationship quality (Path A) and the indirect association between them mediated by disclosure (Path B and C).

This path model was tested in Mplus 7 using the COMPLEX specification. Each communication characteristic that was found significant in the first question was tested in the mediation model as the independent variable. Parent-child relationship quality was the dependent variable, and disclosure status the mediator. Child gender and mother's education level were control variables.

Results

Preliminary Results

Table 3 presents the means and standard deviations of all communication variables both for the full sample and by disclosure status. There appeared to be meaningful mean differences between disclosed and non-disclosed parents in listener responsiveness, communication, and concept focus, components of conversation orientation. This suggested that these communication characteristics might be associated with disclosure, which was tested with the statistical analyses presented below. There did not seem to be mean difference in parent-child relationship quality between disclosed and non-disclosed parents. Therefore, it remained to be examined whether there would be a difference in parent-child relationship quality after taking communication orientations into account.

Table 4 presents the correlations among all study variables. The bivariate correlations showed that disclosure was significantly positively associated with

listener responsiveness, but not with parent-child relationship quality. All the variables except social focus were significantly correlated with parent-child relationship quality. This suggested that some communication characteristics may be associated with both disclosure and parent-child relationship quality. The following statistical analyses further investigated whether disclosure mediated the association between communication characteristics and parent-child relationship quality.

Research Question 1: Communication and Disclosure

In answer to the first research question, probit regression results showed that listener responsiveness was significantly associated with disclosure status (β = .26, z = 2.89, p = .004). Regression results for all communication variables are presented in Table 5.

Research Question 2: Disclosure as Mediator between Communication and Relationship Quality

Results from the first research question showed that listener responsiveness was significantly associated with disclosure, and therefore it served as independent variable in the mediation model (see Figure 2). Results showed that listener responsiveness was significantly associated with parent-child relationship quality (b = .70, 95%CI [.55, .85], β = .44, t = 7.65, p < .001), so for each point increase in listener responsiveness there was .44 increase in parent-child relationship quality. Listener responsiveness was also significantly positively associated with disclosure (β = .39, 95%CI [.15, .63], z = 2.72, p = .007), indicating that higher listener responsiveness was associated with higher probability of disclosure. However, there

was no significant association between disclosure and parent-child relationship quality (b = -.15, 95%CI [-.35, .06], β = -.13, t = -1.20, p = .23), suggesting that disclosure did not mediate between listener responsiveness and parent-child relationship quality. Listener responsiveness explained 45% of the variances in parent-child relationship quality (t = 4.31, p <.001). The indirect effect was not significant (b = -.06, 95%CI [-.15, .03], t = -1.10, p =. 27).

Discussion and Implication

The results confirmed that one aspect of parent-child communication, parental listener responsiveness, is associated with parental disclosure of ART. Disclosure was not found to mediate the relationship between listener responsiveness and parent-child relationship quality.

Because listener responsiveness is a crucial component of the conversation orientation, the study result is in accordance with Braverman et al. (1998) that the tendency to be open in communication among family members may account for why some parents told their families about ART. This finding also echoes previous research findings linking general family communicative openness to parental disclosure of sensitive or private information to children, such as in the case of inherited genetic risks (Metcalfe et al., 2008; Wilson et al., 2004) and maternal HIV infection (Hawk, 2007). Parental communication and concept focus, also components of the conversation orientation, were not associated with disclosure as listener responsiveness was. This may mean that parental ability to listen and pay attention to the child is one key characteristic that distinguishes disclosing parents from

non-disclosing parents. According to Bodie (2012), "one might go as far as to say that listening is the quintessential positive interpersonal communication behavior as it connotes an appreciation and an interest in the other" (p. 109). It might be that both listener responsiveness and disclosure arise from parents' deeply-rooted care and respect for the child. Bodie and Villaume (2003) found that highly people-oriented listeners tended to have more friendly and open communication pattern. Because their conceptualization of people-oriented listening is comparable to that of listener responsiveness, findings from this study echo theirs in that listener responsiveness was related to openly discussing ART. They also speculated that people-oriented listening is associated with self-esteem, which influences acceptance of both the self and others. One major determinant of parental disclosure is whether parents accept the reality surrounding infertility (Nekkebroeck et al., 2008) and whether they are concerned about nonacceptance from the child (Siegel et al., 2008; van den Akker, 2006). Therefore, if listener responsiveness is related to self-esteem, it should also be associated with disclosure because disclosure indicates self-acceptance and confidence in being accepted. However, this line of reasoning is still speculative and requires further research.

None of the components of conformity orientation was significantly associated with disclosure. This result is in agreement with earlier research that found conversation rather than conformity orientation to be a significant predictor of family outcomes (Schrodt et al., 2008). The working mechanism of conformity orientation may be more complicated because it is more about who has the say in the family than

whether family members communicate or not (Schrodt, 2005). If conformity-oriented parents believe disclosure is good for the child and the family, they are also likely to disclose, possibly in a more authoritative way. Conformity orientation does not equate reticence and therefore its relationship with disclosure deserves further research.

For the second research question, listener responsiveness was found to be directly associated with parent-child relationship quality. This may mean that parents who are more attentive listeners have better relationships with the children. The fact that this association was not found to be mediated by disclosure further echoed earlier literature about the centrality of general communication dynamics in parent-child relationship quality (Barnes & Olson, 1985; Metcalfe et al., 2008; Noller, 1995; Stafford & Bayer, 1993; Vangelisti, 2004) as compared to the specific act of disclosure. The study findings also corroborate research findings on the impact of disclosure. Most studies of disclosure in IVF families found neither disclosure nor nondisclosure to have significant effect on child behavioral adjustment or parent-child relationship (Braverman et al., 1998; Colpin & Bossaert, 2008; Ludwig et al., 2008; Nekkebroeck et al., 2008; Siegel et al., 2008). Similar results were also reported by studies of donor-conceived children (Brewaeys et al., 1997; Scheib et al., 2005). Jadva et al. (2009) found that negative psychological effects of disclosure of donor conception were primarily associated with late disclosure, such as in adulthood.

The fact that the conversation and conformity orientations themselves were not found to be associated with disclosure suggests the need for further theorizing. It is possible that these two orientations are not associated with the decision but rather the

strategies of disclosure. Such strategies can be about how parents actually go about telling the child, how they frame the (in)significance of ART conception, or how they deal with the topic in the long run after initial disclosure (Mac Dougall, Becker, Scheib, & Nachtigall, 2007). Perhaps conversation- and conformity-oriented parents have varied but comparable motivations and concerns for disclosure, making them equally likely to disclose or hold back. However, it is reasonable to speculate that the process of disclosure may still differ depending on the specific communication orientation of the family, and that difference can play a role in determining the impact of disclosure. This theoretical speculation would be an important and interesting topic to examine in future research as researchers adopt more contextual approaches to studying ART disclosure.

Because this study considered the disclosure context, it added another piece of evidence that disclosure is not positively or negatively associated with parent-child relationship quality in late childhood. Nondisclosure was not found to be negatively associated with parent-child relationship as discussed in existing literature (Daniels & Thorn, 2001; Golombok & MacCallum, 2003) either. However, it is worth mentioning that the outcome variable of this study, parent-child relationship quality, was coded by coders based on observation. Therefore, if disclosure is associated with psychological consequences that are not easily observed, adding a subjective measure of parent-child relationship satisfaction can more fully assess the impact of disclosure. Still, one strength of this study is that parent-child communication characteristics were observed by coders rather than reported by the parents. Many previous studies of

ART families used parents' self-report to assess parent-child interaction and it was always acknowledged that social desirability may bias the results towards more positive direction (Colpin & Soenen, 2002; Nekkebroeck et al., 2008; van Balen, 1998).

One study weakness warrants attention. The disclosure variable can only be regarded as an approximate, because the parents were asked whether the child knew about his/her ART conception rather than whether they had disclosed the use of ART to the child. Although it is highly possible that the children knew because of parental disclosure based on existing literature (e.g. Daniels et al., 2009; Casey et al., 2008; Siegel et al., 2008), the possibility still exists that the child might have known from other sources. If many children did find out through other people, then disclosure status would not represent parental disclosure. In this case listener responsiveness should not be interpreted as associated with parental openness about ART with the child and alternative explanation needs to be provided.

The major limitations in sample generalizability are the participants' geographic location (primarily from Minnesota) and the age of the children (between 7 and 12 years old). It remains to be seen whether the same result holds for more geographically diverse sample and for parent-adolescent relationship. Moreover, as an initial study of disclosure context, this study included both donor and non-donor ART families. Although family communication may influence disclosure in both types of families, it is likely that the relationship between disclosure and parent-child relationship quality will differ between these two types of families (Ludwig et al.,

2008). Because there were fewer donor families in the sample, let alone disclosed donor families, the impact of disclosure for them might be clouded by that for non-donor families. It would be more favorable to investigate these two types of families separately in future research.

Despite the limitations, this study offers valuable initial insight into the context and effect of disclosure in ART families. By revealing the associations between context and disclosure and between context and family outcome, it emphasizes the importance of including disclosure context in disclosure studies. Such context can be general family characteristics such as communication, the specific reasons for disclosure, or disclosure strategies. For families, clinicians, and counselors dealing with the issue of ART disclosure, this study demonstrates that parent-child communication, especially parents' ability to listen to the child attentively is central to parent-child relationship quality, and that centrality is not affected by disclosure. Therefore, for ART parents concerned about parent-child relationships, it is less of an issue whether they disclose or not; rather, they should focus on parent-child communication dynamics in general, especially how to become attentive listeners to the child. For families with good communication dynamics, the negative impact of disclosure should be less of a concern.

Table 1

Demographics of Study Sample (N = 76)

	N	Percent
Children in disclosed families	14	18.4%
Children in non-disclosed families	62	81.6%
Donor-conceived children	8	10.5%
Child gender		
Male	35	46.1%
Female	40	52.6%
Missing	1	1.3%
	M	*SD*
Child age (in years)	8.5	1.3
Average parental education level[a]	5.0	1.0
Annual household income[b]	9.3	2.5

[a] Parental education level: 4 = Associate's degree, 5 = Bachelor's degree, 6 = Master's or Professional degree

[b] Annual household income: 7 = $60,000-69,999, 8 = $70,000-79,999, 9 = $80,000-89,999, 10 = $90,000-99,999, 11 = $100,000-149,999

Table 2

Definitions and Descriptions of Observed Scales

Name of Scale	Operational Definition	Description of Highest Rating
	Conversation orientation components	
Listener responsiveness	The focal's nonverbal and verbal behaviors that validate and indicate attentiveness to the verbalizations of another interactor.	The focal frequently is responsive, attentive, and oriented to the speaker. A high level of backchannels and assent are used.
Communication	The focal's ability to express his/her own point of view, needs, wants and promote exchange of information with another interactor.	Good communication predominates. The focal frequently uses appropriate reasoning, explanations, and clarifications to make him/herself understood; the focal solicits or demonstrates consideration of the other's views and gives the other appropriate feedback.
Concept focus	The extent to which the focal takes interest in the topic's characteristics when making decisions.	The focal is characterized as providing or seeking information about the topic (asks for clarification, definition, examples, or characteristics) when making decisions. The focal relies almost exclusively on analysis of the topic when making decisions.
	Conformity orientation components	

Authority	Evidence that other interactors rely on the focal's view of a topic when making decisions.	The interactor frequently relies on or takes into consideration the focal's view of a topic when making decisions. When the focal states an opinion, the interactor nearly always listens to the opinion, is nearly always oriented toward the focal so as to better monitor the focal's views, and/or the interactor frequently seeks out the focal's view by asking for his/her opinion.
Control	The focal's attempts and successful demonstrations of influence over another interactor.	The focal frequently attempts to control the interaction. He/she frequently succeeds in controlling individual and/or group actions or opinions, especially when there is initial disagreement.
Social focus	The extent to which the focal relies upon their own and/or other's views of a topic when making decisions.	The focal is characterized as taking others' opinions or positions into account when making decisions. The focal relies almost exclusively on others' opinions or positions when making decisions.
	Outcome	
Parent-child relationship quality	The observer's evaluation of the quality of the dyad's relationship.	The dyad's relationship is characterized as open, satisfying, pleasing, communicative, and/or warm. The individuals have a positive outlook on their relationship. There are few, if any, incidents of negative behaviors. Dyad members appear to be in sync with each other and respond appropriately to each other's needs.

Table 3

Means and Standard Deviations for Observed Variables

	Disclosed (n = 14)		Nondisclosed (n = 62)		Full Sample	
Communication characteristic[a]	*M*	*SD*	*M*	*SD*	*M*	*SD*
Listener responsiveness	5.18	1.80	4.04	1.39	4.25	1.53
Communication	5.05	1.41	4.62	1.30	4.70	1.32
Concept focus	3.73	1.17	4.51	1.58	4.36	1.53
Conversation orientation	4.65	1.33	4.39	1.14	4.44	1.17
Authority	3.21	1.31	3.05	1.06	3.08	1.11
Control	6.79	1.42	6.82	1.29	6.82	1.30
Social focus	4.32	1.17	4.11	1.53	4.15	1.53
Conformity orientation	4.50	.87	4.43	.78	4.45	.79
Relationship quality	6.18	1.20	5.93	.91	5.98	.97

[a] All variables represent computed parent-level communication characteristics. Range = 1-9. Higher value indicates that this type of dynamics is more characteristic of the parents during the observed interaction with the child.

Table 4

Correlations among Study Variables

	1	2	3	4	5	6	7	8	9
1. Disclosure	—								
2. Listener responsiveness	.29*	—							
3. Communication	.13	.71**	—						
4. Concept focus	.20	.25*	.46**	—					
5. Conversation orientation	.09	.81**	.89**	.72**	—				
6. Authority	.06	.30**	.20	.12	.26*	—			
7. Control	-.01	-.19	-.26*	-.16	-.25*	-.01	—		
8. Social focus	-.05	.01	-.17	-.29*	-.18	.01	-.01	—	
9. Conformity orientation	.03	-.03	-.20	-.19	-.17	.34**	.52**	.68**	—
10. Relationship quality	.10	.63**	.57**	.25*	.60**	.30**	-.41**	.21	.02

*$p < .05$ **$p < .01$

Table 5

Probit Regression Results for Communication Characteristics

	B	*SE*	95%CI	*z*	*p*
Listener responsiveness	.26	.09	[.11, .40]	2.89	.004**
Communication	.13	.15	[-.11, .37]	.90	.37
Concept focus	-.32	.24	[-.72, .07]	-1.35	.18
Conversation orientation	.11	.18	[-.18, .41]	.63	.53
Authority	.06	.15	[-.19, .31]	.38	.70
Control	.002	.15	[-.24, .24]	.02	.99
Social focus	.11	.22	[-.25, .48]	.51	.61
Conformity orientation	.07	.21	[-.27, .41]	.33	.75

**$p < .01$

Figure 1

Theoretical Model of Relationships among Parent-Child Communication, Disclosure and Parent-Child Relationship Quality

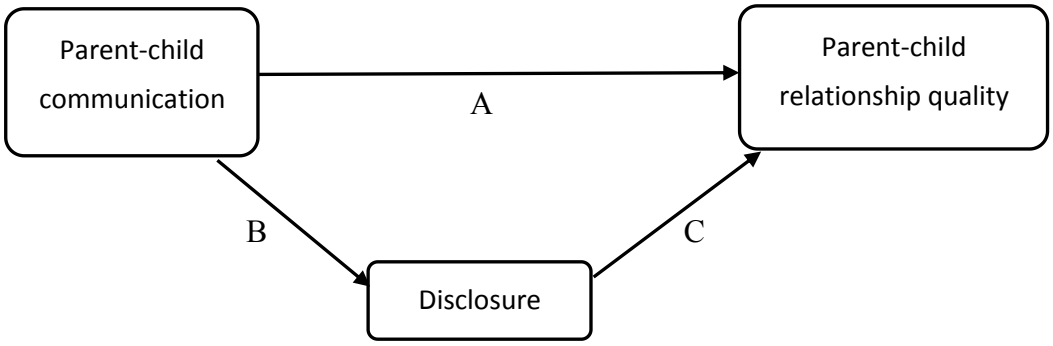
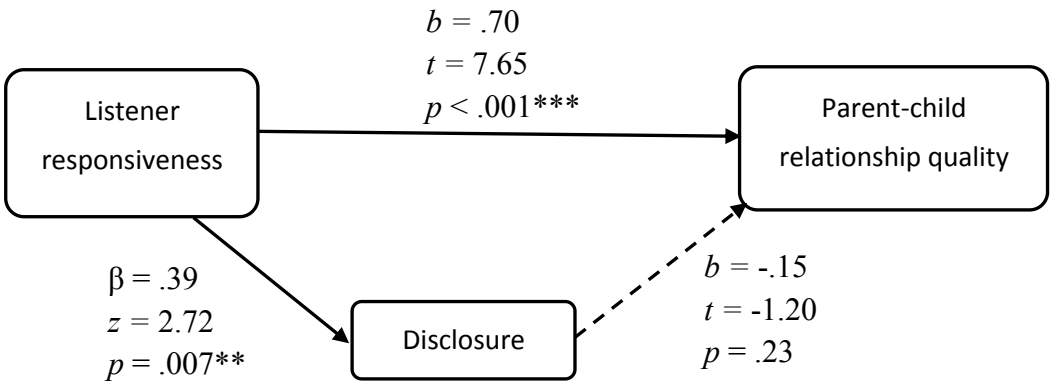


Figure 2

Mediation Model Result



**$p < .01$ ***$p < .001$

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